

ECONOMIC BENEFITS OF THE WI LAKE MICHIGAN FISHERY IN A DYNAMIC ENVIRONMENTAL AND REGULATORY REGIME

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MOTIVATION

The Great Lakes fisheries are an integral part of Wisconsin history and culture...

- Substantial resources devoted to their management

Our intuition and indirect statistics tell us they have value:

- 138,000 WI Great Lakes recreational anglers in 2011
- 977,000 days spent angling in WI Great Lakes in 2011
- \$86.4 million on WI Great Lakes trip-related spending in 2011

Great Lakes sport fishing generally:

- Generates \$7.7 billion in economic activity annually
- Supports 49,000 jobs



A DYNAMIC ENVIRONMENT

Recreation fishing on the Great Lakes has fallen:

- 235,000 WI Great Lakes anglers in 2006 spent 3.7 million days

The Great Lakes ecosystem is heavily influenced by humans

- Threats from invasive species
- Conventional water pollution
- Changing climate
- Stocking-dependent sport fishery
- A multiple-use resource

How do these changes affect the ability of the Great Lakes to provide recreation value for anglers?



RESEARCH QUESTIONS

Our project examined the following questions:

- 1) What are the economic benefits to anglers from the fishery under current conditions
- 2) How might the economic benefits change under alternative environmental and/or management regimes?

Work on the project was completed last year.



CONCEPTUALIZING ECONOMIC BENEFITS

The market economy

- Jobs supported
- Direct spending on activity-related items
 - e.g. food and lodging, fuel, bait, equipment, etc.
- indirect spending or multiplier effects
 - e.g. bait shop owner earns income that he spends on groceries

These market spending effects are the basis for the ‘\$7.2 billion fishery’ statement...they arise from the ‘supply side’ of the industry

Is this the only way to assess the benefits provided by the fishery?

Can we learn something from the ‘demand side’?



The nonmarket economy – what are the benefits to *individual anglers* from the opportunity to fish the Great Lakes?

A thought experiment:

- If there were a ‘price’ for taking an angling trip how much would a fisherperson ‘pay’ for the trip?
- *This rhetorical ‘willingness to pay’ is a good indicator of how much the angler benefits from a trip*
- Can also think about the willingness to pay (WTP) for an improvement in catch rates, reduction in pollution, etc.

Measuring individuals’ willingness to pay is a way to understand the nonmarket (demand) side benefits of the fishery



MEASURING NONMARKET BENEFITS

We can ask people to select from among different Great Lakes trip configurations:

11. Which of the following options would you prefer? Please choose only one.

	Option A	Option B	Option C
• Target species	Chinook Salmon	Lake Trout	
• Number of target species caught	2	1	
• Average size of target species	10 pounds / 30 inches	15 pounds / 35 inches	Do something other than fish Lake Michigan or Green Bay
• Secondary target species	Coho Salmon	Rainbow Trout	
• Likelihood of catching secondary species	High	Low	
• Trip cost per person	\$150	\$50	
Preferred option	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Try to understand what features of a trip people are willing to pay more or less for...how would they trade off cost against other aspects?



WI ANGLER SURVEY 2016

We surveyed ~500 WI anglers about their **Great Lakes fishing behavior**:

- Sample drawn from salmon stamp holders and licensed anglers
- Solicited information used to classify anglers as targeting **salmon**, **trout**, and/or **warm water** species
- Respondents answered 6 choice questions...
- ...with varying 'attribute levels'

We used the survey data to conduct statistical analyses to quantify cost/attribute tradeoffs.

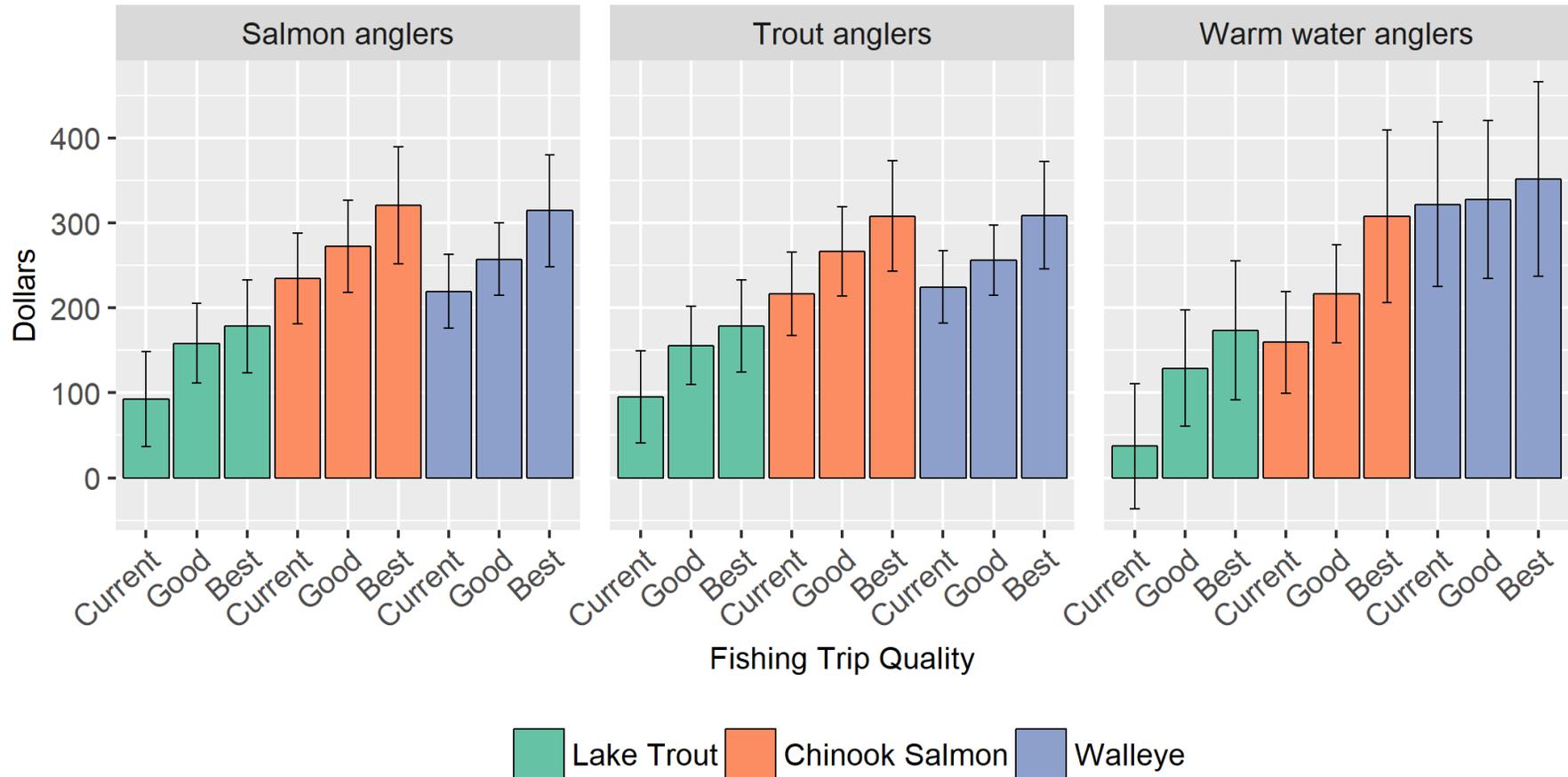


ATTRIBUTE LEVELS

Attribute	Levels
Main target species (2 nd target species)	Chinook salmon (Coho Salmon) Lake trout (Rainbow Trout) Walleye (Yellow Perch)
Main Target Catch	Low, medium, high (# varies by species)
Main target Size	Small, medium, large (# varies by species)
2 nd target catch likelihood	Low, high
Trip cost	\$50, \$100, \$150, \$200



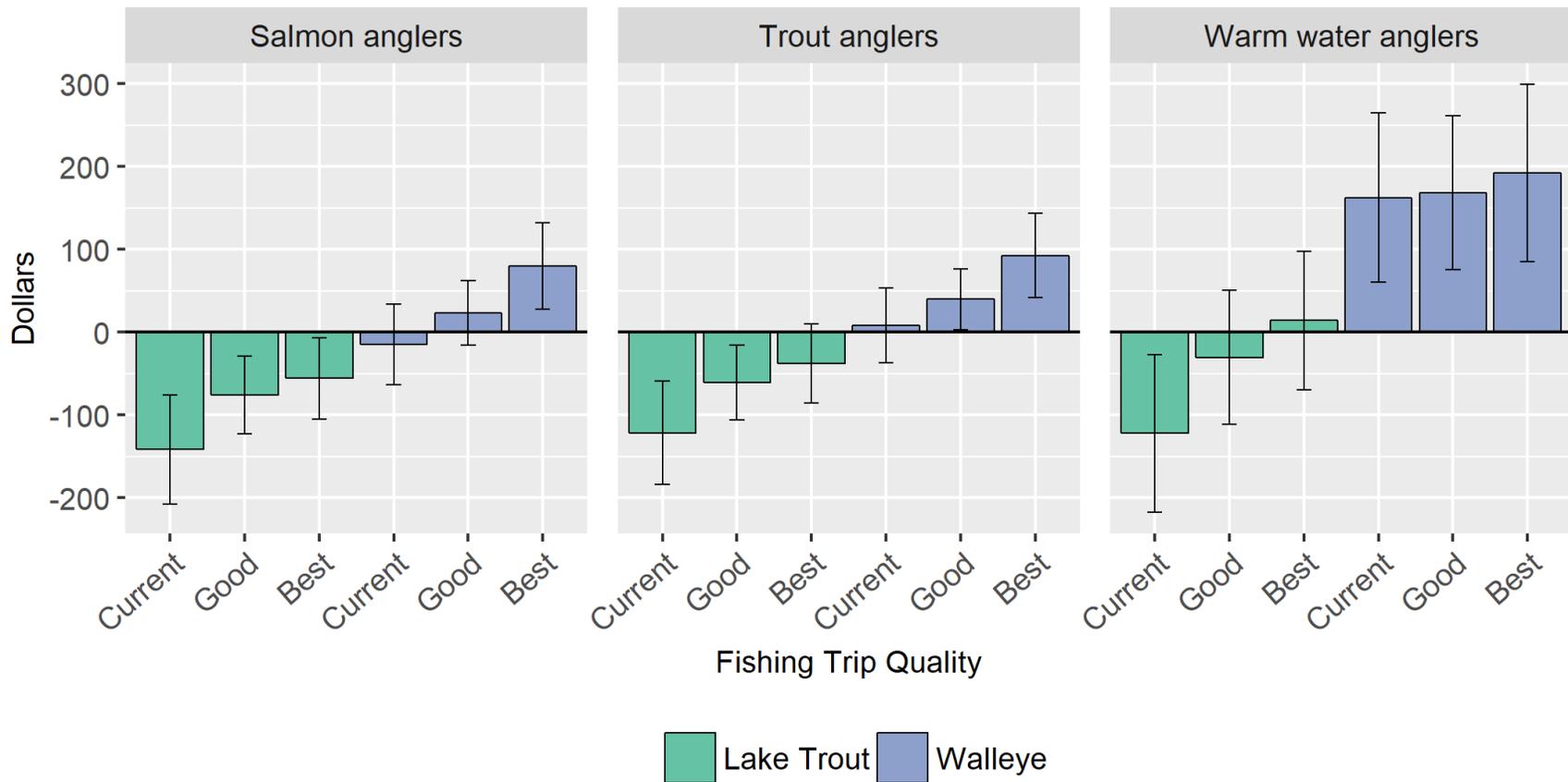
WILLINGNESS TO PAY FOR A TRIP (VERSUS NO TRIP)



Chinook and walleye are highest value species



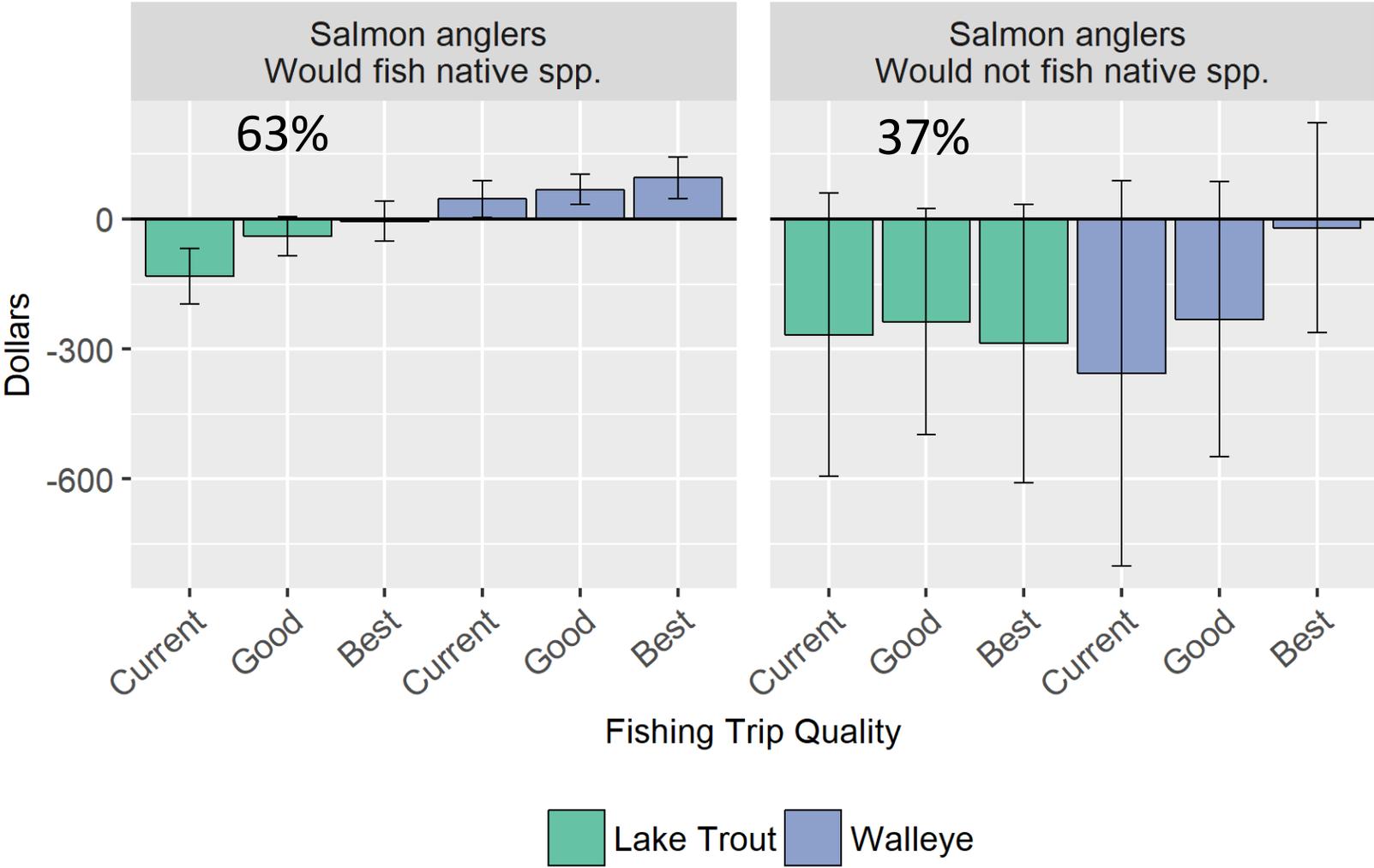
WTP FOR A NON-CHINOOK TRIP (VERSUS A CHINOOK TRIP)



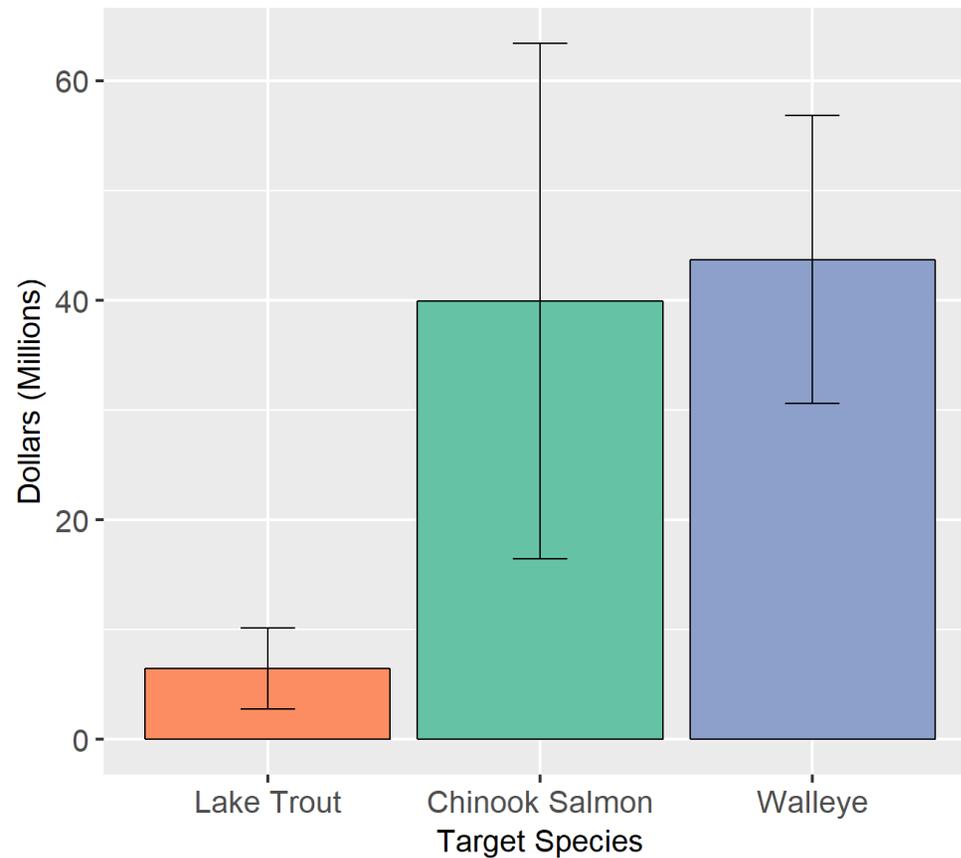
Lost value at current conditions...somewhat mitigated by improved lake trout and walleye fisheries



TWO TYPES OF SALMON ANGLERS



AGGREGATE ECONOMIC VALUE – CURRENT CONDITIONS



*Total value = salmon value + lake trout value + walleye value = \$90.1
million*



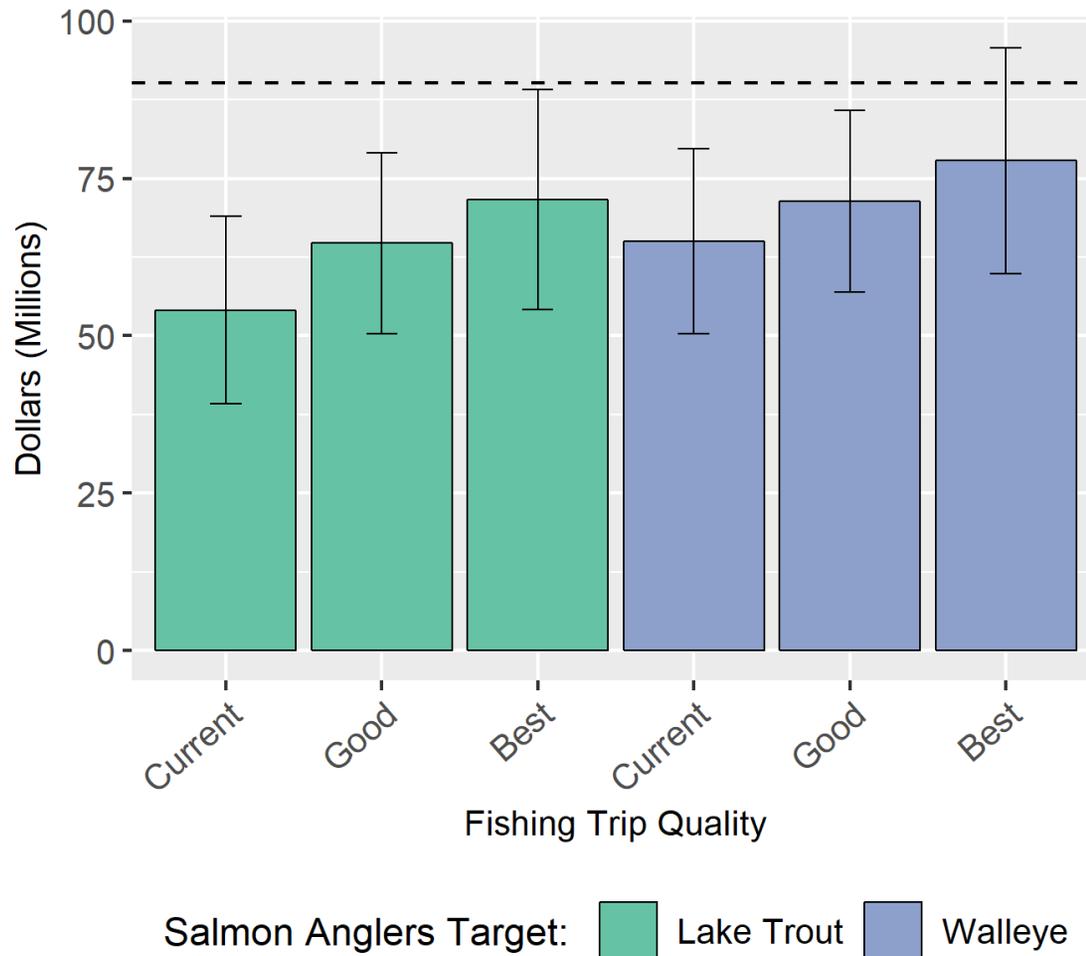
AGGREGATE ECONOMIC VALUE – POTENTIAL FUTURE CONDITIONS

Suppose:

- Lake Michigan salmon fishery collapses
 - 37 percent of salmon anglers exit the fishery
 - 63 percent of salmon anglers of who stay in the fishery target lake trout or walleye
- Walleye and lake trout fisheries stay the same or improve
 - same number of trips from walleye and lake trout anglers

Idea: look at value when an ecological change leads some to substitute to a less-valued (but potentially improved) target species





Best lake trout conditions – \$71.6 million... value of fishery falls by ~20 percent relative to current conditions



FINAL REMARKS

The economic value generated by the fishery is substantial... but it has fallen over time as the # of anglers and salmon abundance have decreased.

- Native and non-native fisheries are economically important but in flux

Is total economic value best preserved by:

- focusing on higher value but ecologically non-sustainable (?) Chinook fishery?
- or more resilient (?) but less valuable native fisheries?

Our results suggest there are immediate and long term tradeoffs to consider



QUESTIONS?

